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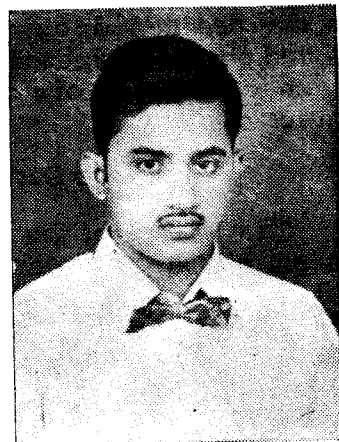


CORALS -

Raw Material for Industries

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The class Anthozoa of phylum coelenterata includes the corals, sea-anemones, sea fans and gorgonians. Until the beginning of the 18th century corals and their relatives were generally regarded as plants. It was Peyssonnel, a Marseilles physician who showed that corals are animals which move and eat. Coral organisms are polyps like the sea anemones. They are relatively short and stout and have a flat oral disc. They lead a colonial life. The calcareous skeleton is secreted as a protective shell by the outer cell layer of the polyp's body. A single completed branch of coral bears a number of polyp organisms. The coral of commerce is actually the calcareous skeleton. Milliporina and Stylasterina are hydrozoan corals belonging to another class of phylum Coelenterata and they are also associated with coral formation. The calcareous secretions of billions of colonial coral polyps form ridges or mounds thrusting up in the sea to the surface. These are coral reefs. Other shell bearing animals like foraminiferans, molluscs branchiopods, tube worms and sponges also contribute to

the formation of coral reefs. In the formation and sustenance of many of the reefs, the contribution of calcareous algae also is considerable. The brilliantly coloured fishes moving about the reef, the reef building animals and plants, the diverse forms and colours of corals, all wonderfully blend to provide a most ~~en~~chanting feast to the eyes.

The reef building corals thrive only above 20°C and in shallow waters. So the distribution of coral reefs is confined to the tropical and subtropical belts of the world. There are three main types of coral reefs: Fringing reefs, Atolls and Barrier reefs. Fringing reefs are very near to the shores while barrier reefs are 80 to 160 km. from the shore. Atolls are circular or oval reefs enclosing a lagoon.

"Everyone must be struck with astonishment when he first beholds one of these vast rings of coral-rock, often many leagues in diameter, here and there surmounted by a low verdant island with dazzling white shores, bathed

on the outside by the foaming breakers of the ocean, and on the inside surrounding a calm expanse of water, which from reflection, is of a bright but pale green colour ”.

— Charles Darwin, 1842.

The lagoon of the atoll varies in depth with the size of the atoll. It may be 10 to 60 meters deep and is often studded with masses of coral growing up from the bottom. So navigation is dangerous. Studies on the biological nature of the shallow fringing region of the reefs have proved them to be remarkably productive. The photosynthetic rates of these areas are comparable to the most productive regions on earth. They equal the rates measured for the same area of rice paddies.

The reef building corals do not flourish below 50 meters. But many of the reefs have a much greater extension downwards. To explain this geological problem a number of theories have been put forward. In the seas around India all the three major types of reefs are seen. Barrier reefs and Atolls are seen in the Laccadives, and Maldives. Fringing reefs are present along the south-eastern end of the Indian Peninsula, from Rameswaram to Tuticcrin. Along the western coast of India they are seen in the Gulf of Kutch. Excepting these two formations, the coastal waters of India are devoid of any coral reefs. This is supposed to be because of the fresh water and mud brought by the great rivers into the coastal seas. The growth rate of corals are very slow. Studies on the Maldivian corals have shown that their growth rate is about 25 cm. per annum.

Corals are collected by dragnet-like instruments. But in the Ramnad district of Tamil Nadu large quantities of corals

are dynamitted and brought ashore. It is used as a raw material in the manufacture of calcium carbide. Coral quarrying has become a means of livelihood for many people in this area. A labourer engaged in the collection of coral earns about four or six rupees a day. The Rameswaram island has large deposits of coral limestone on the land also. On the land under the swamps, roughly 9,000 tonnes per acre can be recovered as Limestone. These deposits are about 2 meters thick and contains all varieties of semi fossilized corals. In the Kutch region the beach sand itself contains fragments of corals and they are used for manufacturing cement.

The skeleton of stony corals has several uses. Living, dead and semi-fossilized Porites is used for various building purposes as a substitute for granite. In South India it is at present used in the manufacture of calcium carbide. Annually about 20,000 tonnes of corals are used for this purpose. Coral limestone is used for metallurgical uses also. For every tonne of pig iron produced, a flux limestone of 300 Kg. is needed. This helps in the removal of silica, alumina, manganese and sulphur. The calcium present in the coral react with the above impurities and forms a slag in the iron furnaces. It is tapped out. This slag can be used to make slag cement for construction purposes. Coral stones can be added in the glass making process. It will improve the mechanical properties of glass by making it less fragile and more strong. In paper industry, for the recovery of caustic, coral lime can be used. Coral stones can also be used for acid neutralisation, for the manufacture of calcium cyanamide, calcium based chemicals for agriculture, mineral food and water treatment. Agricultural operations need a large quantity

of calcium for mixed fertilizers, animal mineral food, poultry grits and neutralising agents. Coral stone is applied directly to soil or as lime to reduce the acidity. Coral limestone is used in the manufacture of abrasives, calcium calking compounds, ceramics, chewing gum, fabrics, floor coverings, insecticides, leather goods, paint, paper, phonograph records, putty, rubber, plastics and pottery. In the coastal regions of Ramnad and Tirunelveli corals have been widely used as building material. Big buidings, churches and naval dock-yards have been constructed using coral stones. The road connecting Ramnad and Mandapam has been laid over a coral stone base. Many of the rural roads in this region are all formed out of this material.

Specific gravity of the coral ranges from 1.6 to 2.7 which closely approaches to that of Calcite. Its hardness is about 3.75. This low hardness facilitates the carvers task. Although coral does not take a fine polish, its beautiful hue compensates for it. As it is slightly opaque, scratches do not show. Since it is composed chiefly of calcium and Magnesium carbonates, acidulous perspiration affects its surface. In addition to the calcium carbonate which forms the major part, traces of other compounds like silica, alumina, iron compounds and Magnesia are also present in the coral stone.

From remote antiquity, men, and naturally women also have prized red coral, *Corallum rubrum*, as an ornament. The use of corals for personal adornment goes back at least as far as the 3rd century B. C. It was described by the Greek philosopher and naturalist, Theophrastus. In Roman times precious coral was taken from the Mediterranean.

Romans believed that corals had beneficial medicinal effects as cooling the human blood and reducing inflammation. Coral and amber were highly prized by the ancient Gauls and were extensively used in Jewellery. Pliny, writing in the first century A. D., reported that the trade in precious coral from the Mediterranean to India and Persia had become such an attractive business that it was difficult for the Gauls to obtain what they wanted to decorate their weapons. In India the precious coral, *Corallum rubrum* is considered to be one of the precious stones and is known as 'Pavizham'. The organ pipe coral, *Tubipora*, has a place in certain indigenous medicines in South India. In the premises of the ancient Rameswaram temple corals are offered for sale after being beautifully painted. Before 1900 most of the commercial corals came from the Mediterranean sea. Then Japan entered the coral industry and the Mediterranean coral fishing has slowly died out. After second World War, Japanese coral fishery has also dwindled.

For ornamental purposes corals obtained from the sea are sorted into black coral, common red and various other categories. The working of coral into ornamental objects is done mainly by Italian craftsmen. Italian carvers are very deft in executing little coral cameos with floral or animal designs and sometimes with human figures. They are very ingenious in utilizing the imperfections of the material to produce striking effects. In India also corals are set in necklaces, garters and amulets and have a religious use as a gift to the dead as it is believed to keep evil spirits away.

It has been aptly remarked that a fondness for coral indicates a certain degree of culture in a race. ●●